



A tale of two inventions

Radiofrequency ablation catheter system.

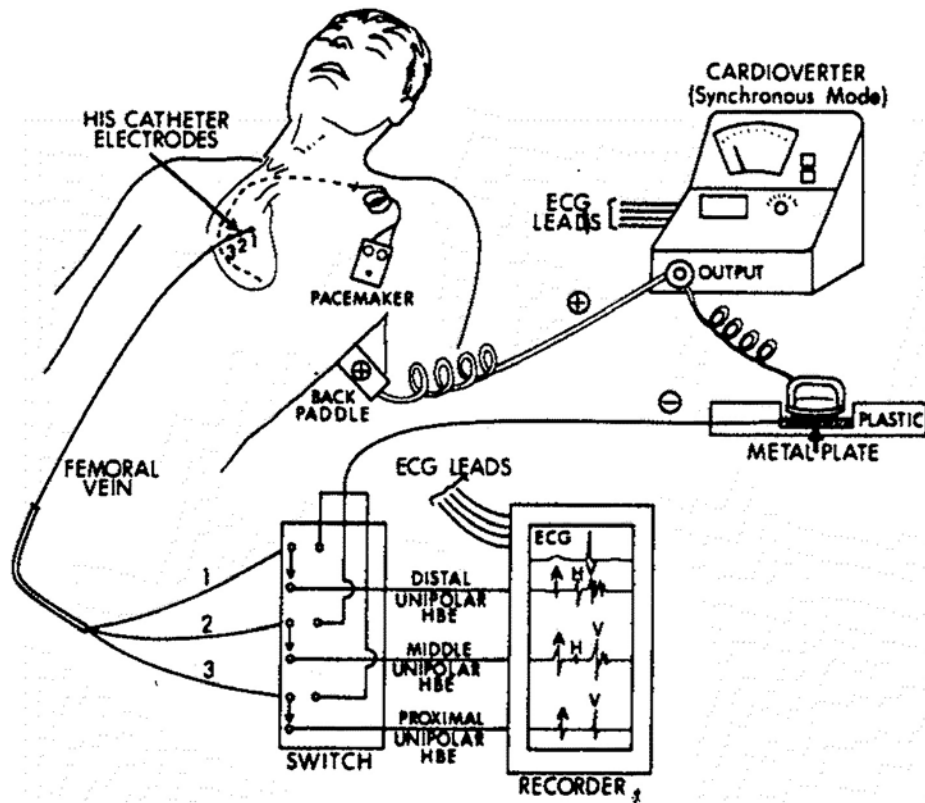
Balloon ablation of the pulmonary veins.

Jonathan Langberg, MD

Professor of Medicine

Director, Section of Cardiac
Electrophysiology

Interventional Cardiac Electrophysiology, 1988



DC Shock ablation limitations

- General anesthesia
- Barotrauma
- Not titratable
- Early recurrences



Advantages of RF ablation

- Track record of use in oncology, neurosurgery, and GI endoscopy.

J J Langberg, M C Chin, M Rosenqvist, J
Cockrell, N Dullet, G Van Hare, J C Griffin
and M M Scheinman

**Catheter ablation of the atrioventricular
junction with radiofrequency energy.**

Circulation. 1989.

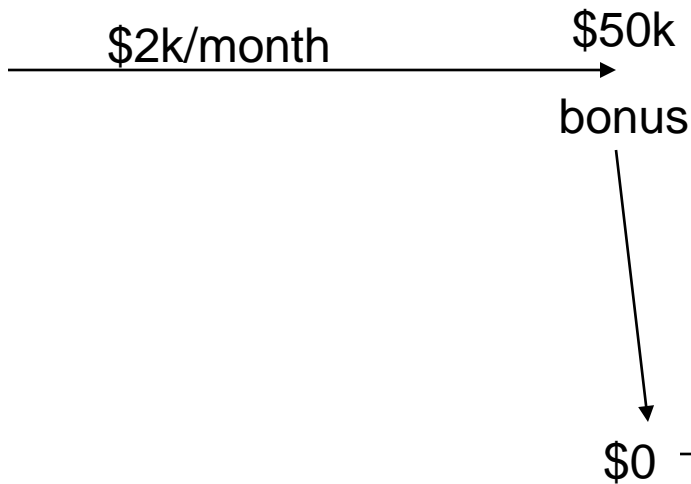
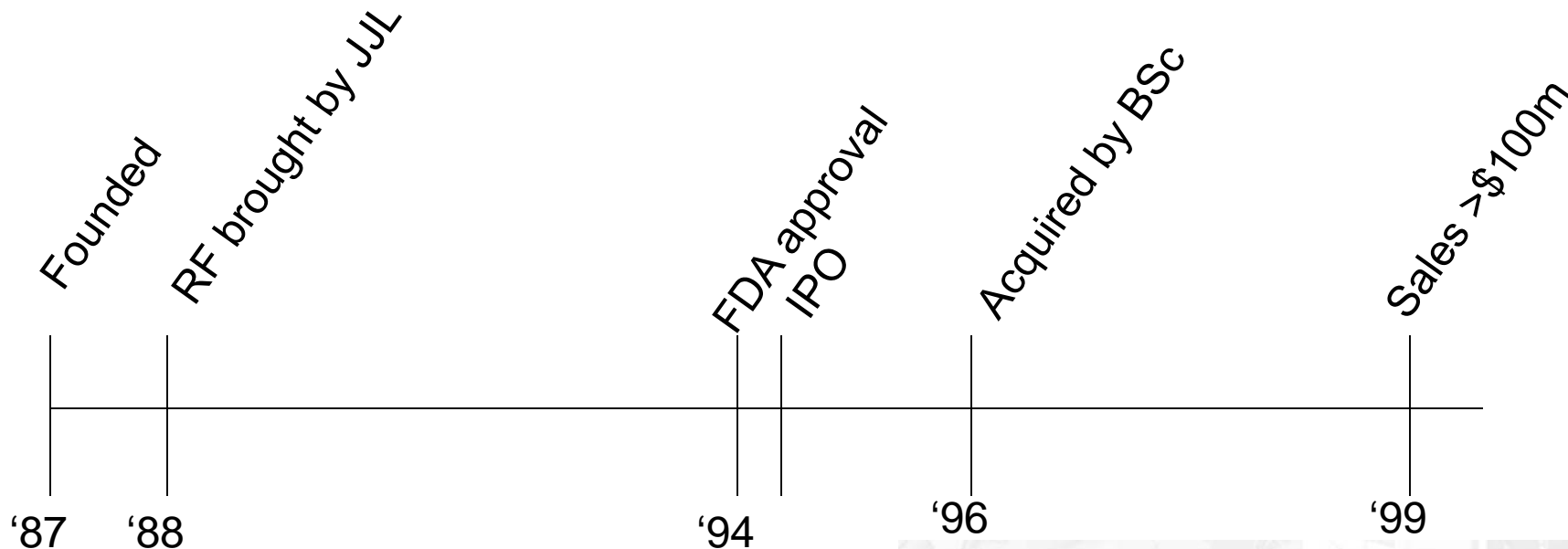
- Painless – no general anesthesia required.
- No barotrauma.
- Both power and duration can be adjusted, allowing titration of dose.
- Thermal effects are stable – late recurrence rare.



RF ablation system

- Large distal electrode to increase contact area and lesion size.
- Deflectable shaft to facilitate catheter placement and contact force.
- Temperature monitor incorporated into the catheter tip.
- Power supply with temperature feedback control of power output.
- Automatic shutoff for sudden rise in impedance due to overheating.

EP Technologies

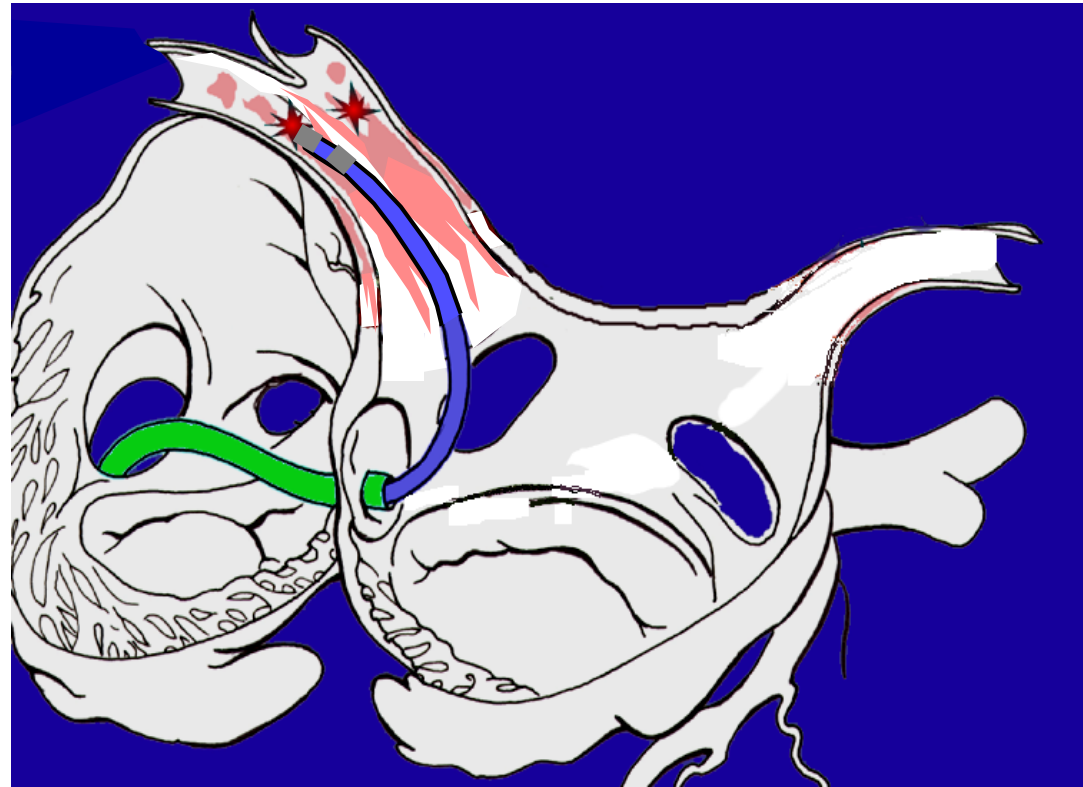
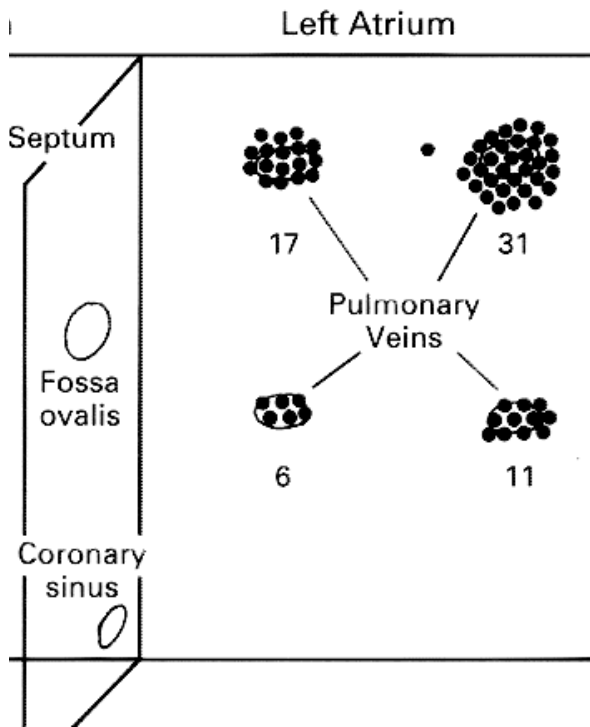


#11 EPT-1000™ Cardiac Ablation System
Introduced in 1994 by the Electrophysiology business



The EPT-1000 was the first temperature-monitoring cardiac ablation system approved by the FDA. These devices are used to treat people living with various cardiac arrhythmias -- a condition that afflicts well over two million Americans -- by delivering radiofrequency (RF) energy via an ablation catheter to render the heart's abnormal sites electrically inactive. Still a market leader today, the EPT-1000 RF Systems are used in more than 80 percent of electrophysiology labs across the United States.

Catheter ablation of atrial fibrillation



(12) **United States Patent**
Lesh et al.

(10) **Patent No.:** **US 6,254,599 B1**
(45) **Date of Patent:** ***Jul. 3, 2001**

(54) **CIRCUMFERENTIAL ABLATION DEVICE ASSEMBLY**

WO 93/08755 5/1993 (WO).
WO 93/16632 9/1993 (WO).

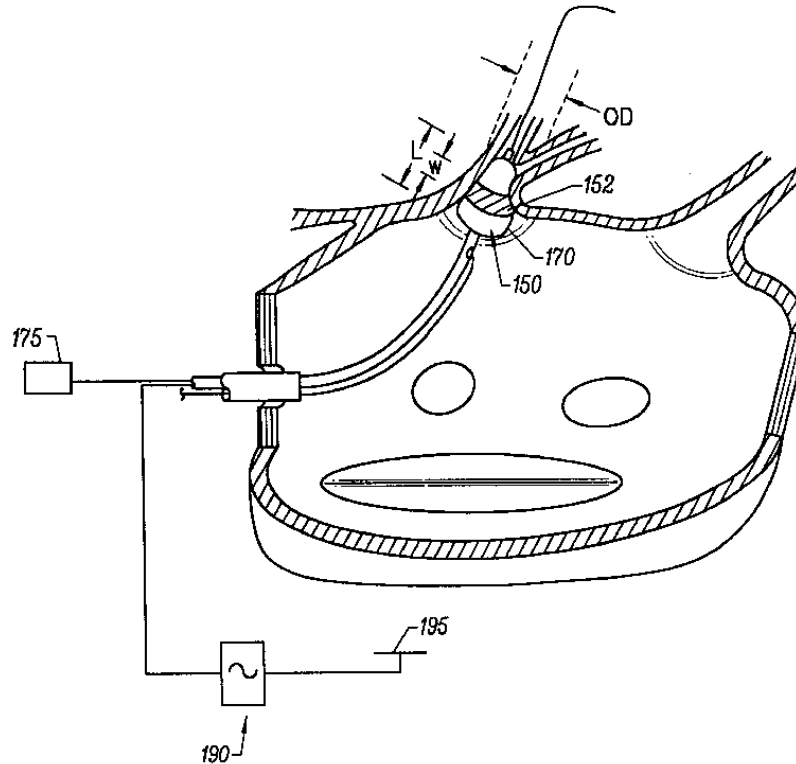
(List continued on next page.)

(75) **Inventors:** **Michael D. Lesh**, Mill Valley; **Michael Ronald Ross**, Hillsborough, both of CA (US); **Jonathan J. Langberg**, Atlanta, GA (US); **James C. Peacock, III**, Sunnyvale, CA (US)

OTHER PUBLICATIONS

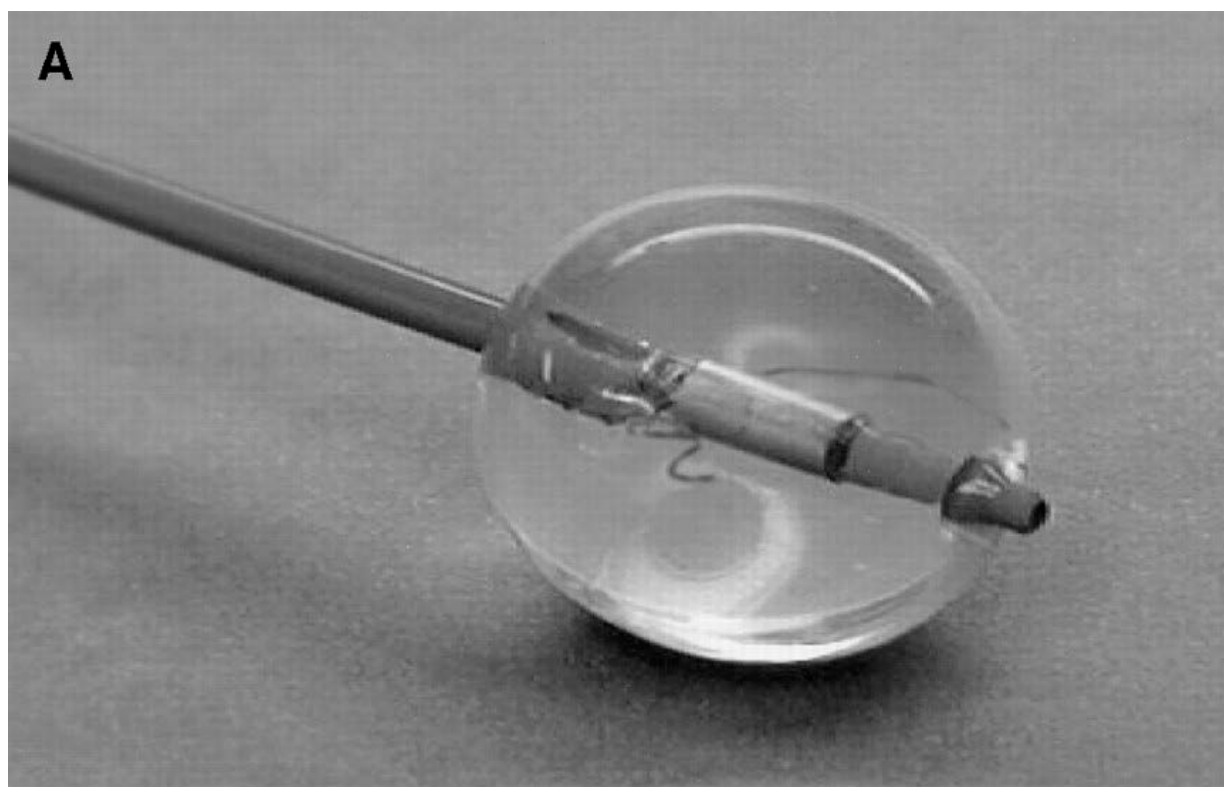
Boaz Avitall et al., "Physics and Engineering of Transcatheter Cardiac Tissue Ablation," Review Articles, the American College of Cardiology, pp. 921-932, 1993.

(73) **Assignee:** **Atrionix, Inc.**, Palo Alto, CA (US)



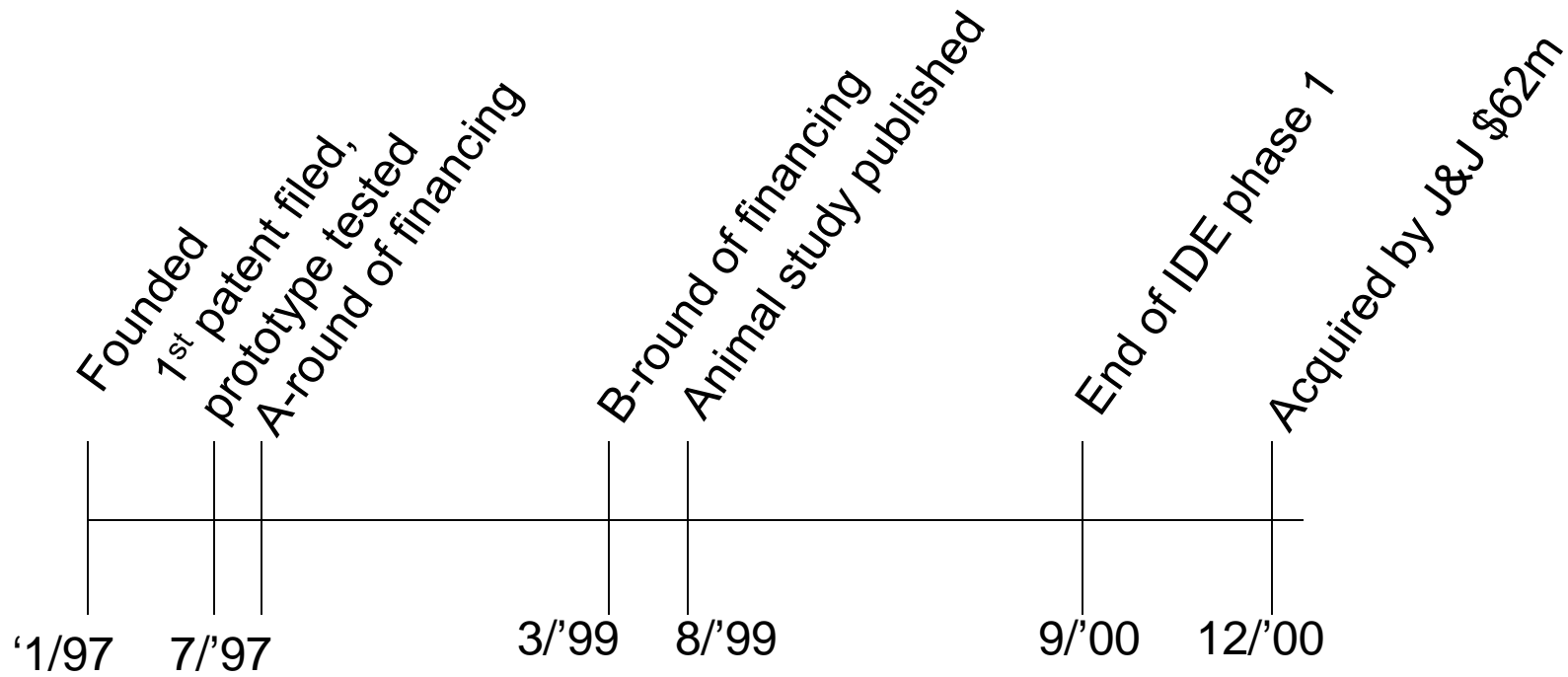


Ultrasound balloon catheter for AF

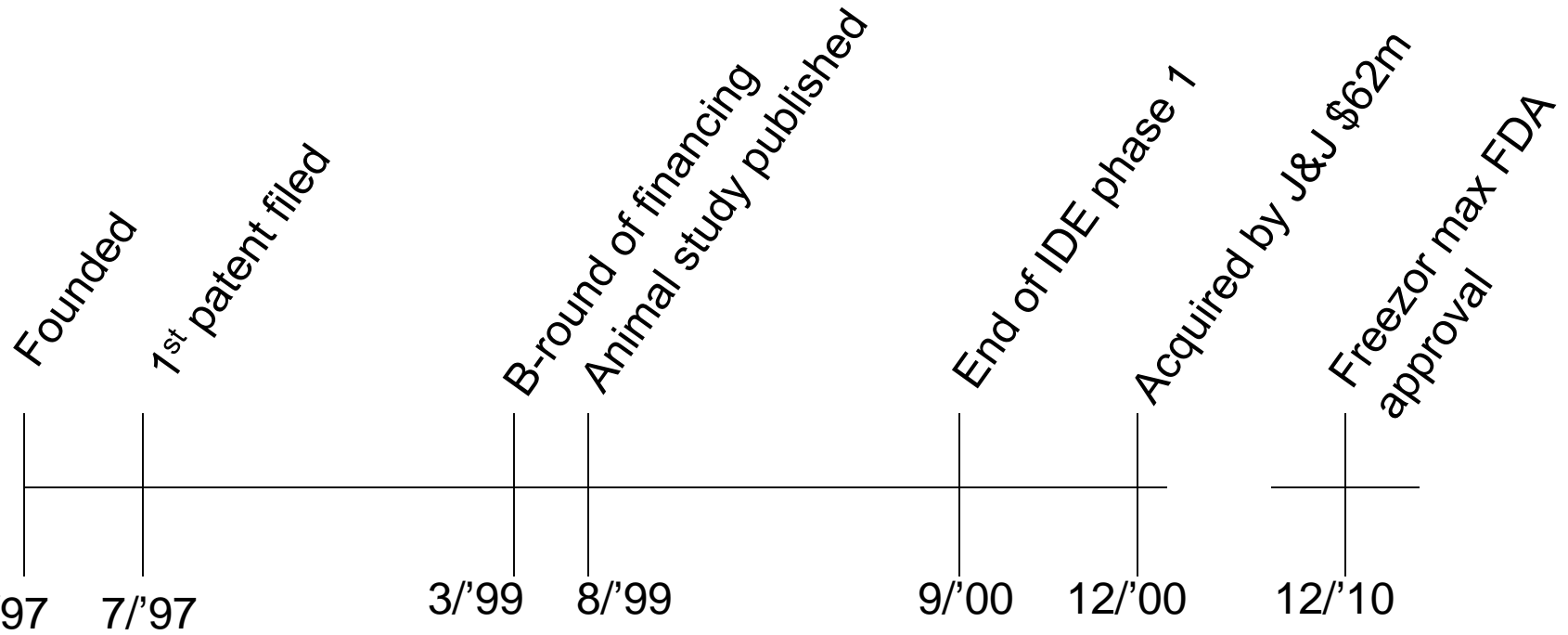




Atrionix, Inc



Atrionix, Inc



Suggestions for Physician Inventors

- Ideas that are 2-5 years ahead are the best.
- Do your own pubmed and patent search.
- Draft your own provisional patent before seeing patent counsel.
- Use NDAs before discussing your invention.
- Don't get maternal about your idea.

Truisms for Physician Inventors

- The size of the baby is proportional to the amount of gestation.
- Companies don't succeed unless someone's future depends on it.
- Physician founders are often considered liabilities after the formative phase is over.
- Even very simple proofs-of-concept add great value to a start up.